

CLAIMS

1. A hybrid rocket engine comprising:
 - a solid fuel grain;
 - a combustion chamber defined in part by said solid fuel grain, said combustion chamber having a substantially closed end, an outlet end having a fluid outlet opening and a wall portion between said closed end and said outlet opening, said wall portion having an inner surface; and
 - one or more fluid inlet openings in said wall portion for directing a fluid into said chamber to create a spiral flow of said fluid along said inner surface toward said closed end.
2. The rocket engine of claim 1 wherein said wall portion includes a side wall portion and an outlet end wall portion.
3. The rocket engine of claim 2 wherein at least one of said one or more fluid inlet openings is positioned in said side wall portion.
4. The rocket engine of claim 3 wherein at least one of said one or more fluid inlet openings is positioned adjacent to said outlet end wall portion.
5. The rocket engine of claim 4 including a plurality of said one or more fluid inlet openings positioned adjacent to said outlet end wall portion

6. The rocket engine of claim 5 wherein said side wall portion is substantially free of said one or more fluid inlet openings other than said plurality of fluid inlet openings.
7. The rocket engine of claim 6 wherein said side wall portion is generally revolute in geometry.
8. The rocket engine of claim 1 wherein said combustion chamber is generally revolute in geometry.
9. The rocket engine of claim 2 wherein at least one of said one or more fluid inlet openings is positioned in said outlet end wall portion.
10. The rocket engine of claim 9 including a plurality of said one or more fluid inlet openings positioned in said outlet end wall portion.
11. The rocket engine of claim 10 wherein said side wall portion is free of said one or more fluid inlet openings.
12. The rocket engine of claim 10 including a common manifold for supplying said fluid to said plurality of fluid inlet openings.
13. The rocket engine of claim 10 wherein said side wall portion is generally revolute in geometry.

14. A method of propelling a rocket comprising:

providing a hybrid rocket engine having a combustion chamber defined in part by a fuel grain and having a substantially closed end, an outlet opening opposite said closed end, a wall portion between said closed end and said outlet opening and one or more fluid inlets in said side wall portion;

introducing a fluid comprising one of a fluid fuel and a fluid oxidizer into said combustion chamber through said fuel inlets to cause said fluid to move in a substantially spiral path along said wall portion and said fuel grain toward said closed end to form a mixture of said fluid and said fuel grain; and

igniting said mixture in said combustion chamber.

15. The method of claim 14 including providing a combustion chamber in which said wall portion includes a side wall portion and an outlet end wall portion.

16. The method of claim 15 including providing a combustion chamber in which at least one of said fluid inlets is in said side wall portion adjacent to said outlet end wall portion.

17. The method of claim 15 including providing a combustion chamber in which at least one of said fluid inlets is in said outlet end wall portion.

18. The method of claim 15 including providing a combustion chamber in which said side wall portion is substantially revolute in geometry.

19. The method of claim 14 including providing a combustion chamber which is generally revolute in geometry.